

# **Visualization:**

**Free and open source options for communicating data**

## **What we're doing today**

Data visualization & infographics

Examples of both

**8 graphic design basics**

**Resources**

## **About me**

### **Poppy Riddle**

A PhD student positioned between LIS and HCI.

Curious about how we might improve searching for information visually.

Researching how immersive visualization using augmented reality may improve our ability to understand complex relationships in the data.

Art and design education background.

## **Visualization beyond Excel**

### **What's wrong with Excel?**

Both Excel and Tableau are great for exploration and presentation of data.

Its very recognizable.

Its both the tool and the viewer.

OtherLevels: <https://www.youtube.com/@OtherLevels>

### **Visualization's multiple names**

Visualization is the practice of making results from data analysis more easily interpreted by visual or other means.

Overlapping terminology: data visualization, information visualization, scientific visualization, statistical graphics, exploratory data analysis, data art

Graphs, charts, maps, networks

## **Examples of visualization**

### **Data visualization**

Data visualization is the representations of a reduced set of data.

It is an abstraction to help us understand the what the data is about, and how its been reduced.

See Nathan Yao's Flowing Data catalog of chart types. <https://flowingdata.com/chart-types/>

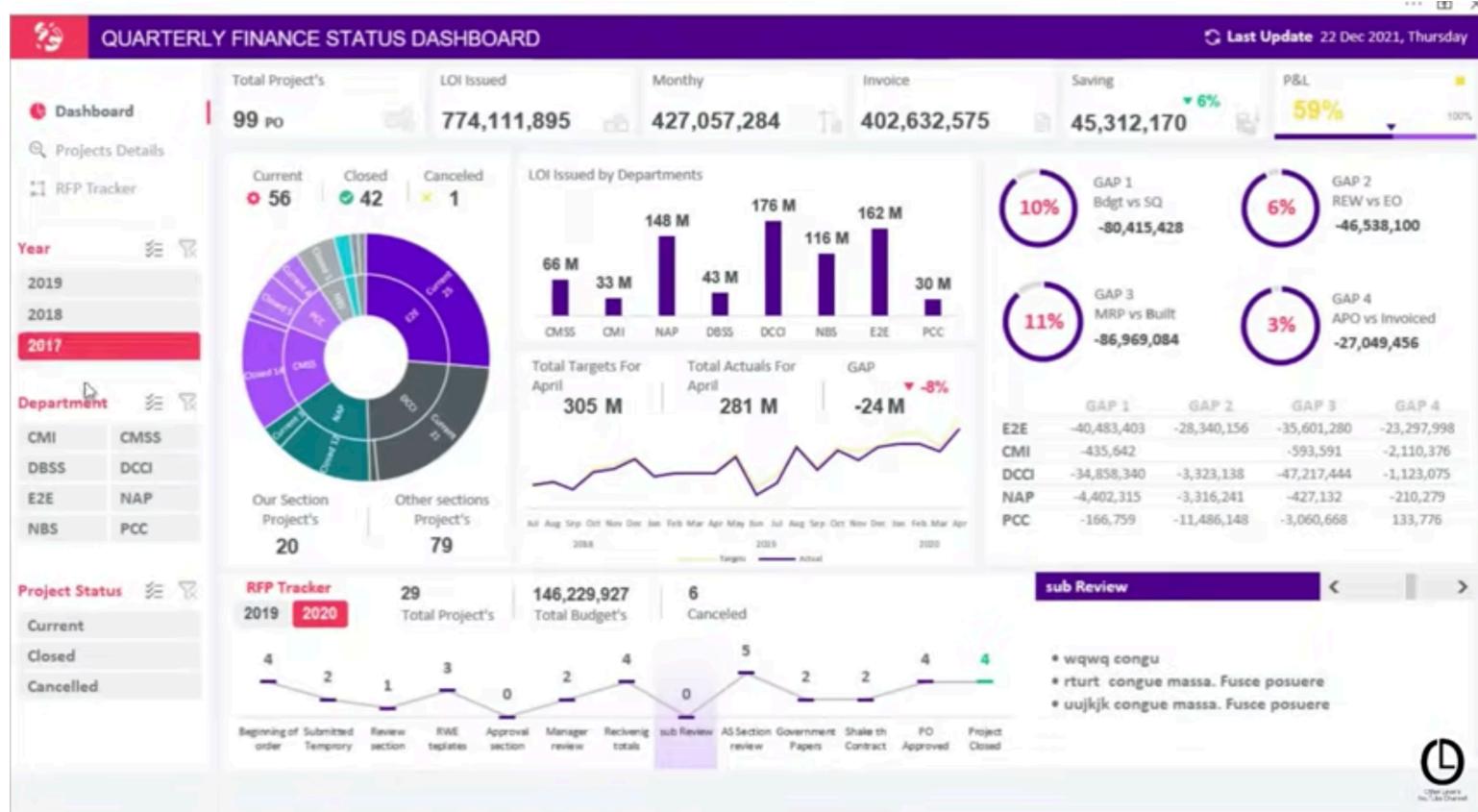
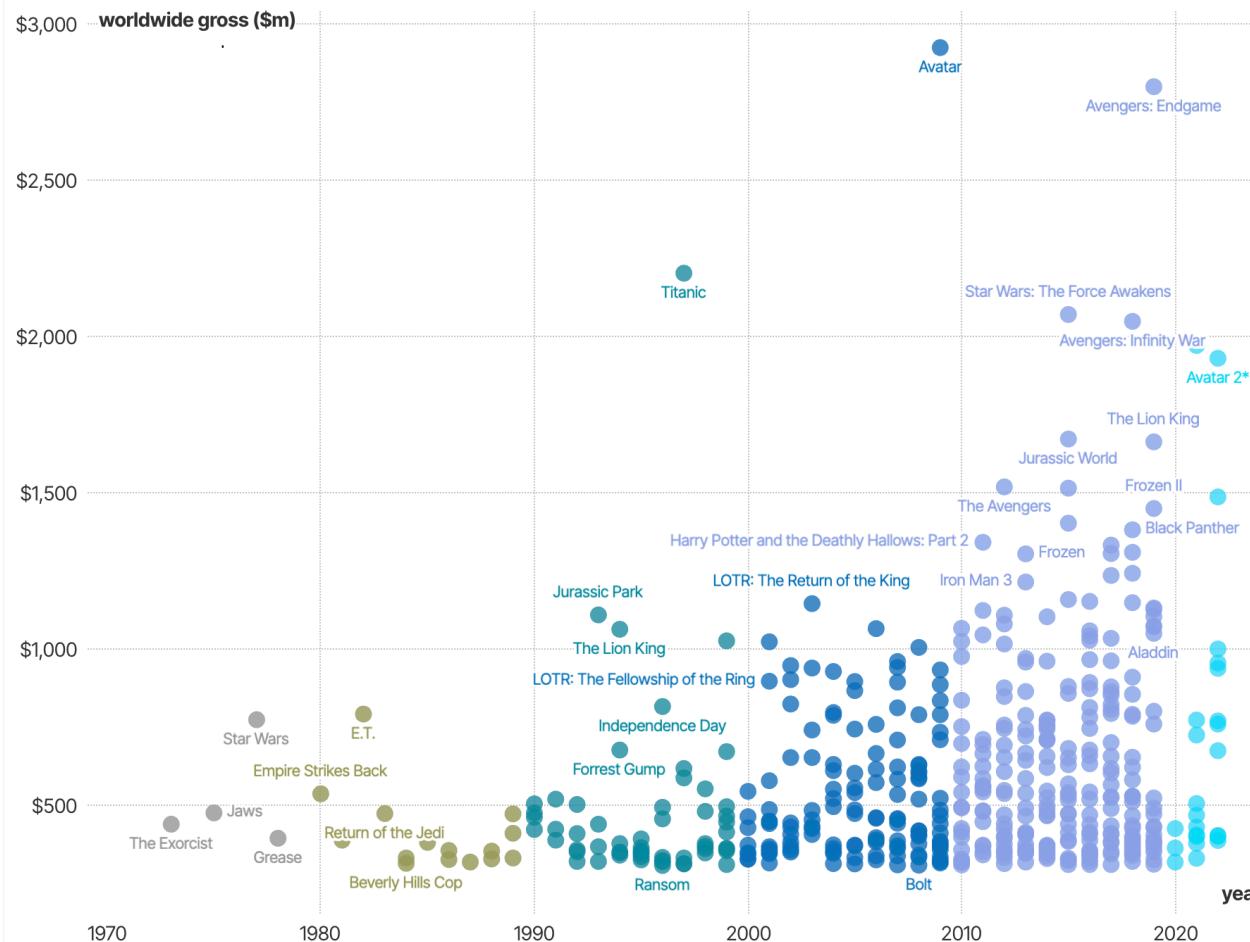


Figure 1: source: <https://www.other-levels.com/blogs/datasets>

# Top 500 Hollywood Movies by Worldwide Box Office Gross

search...

1970's 1980's 1990's 2000's 2010's 2020's



David McCandless, Tom Evans, Paul Barton - **Information is Beautiful**

MADE WITH **VIZsweet**

## **Infographics**

Infographics are intended to communicate a cohesive narrative that may include tables, graphs, diagrams, maps, etc. They can be quite artistic to gain your attention.

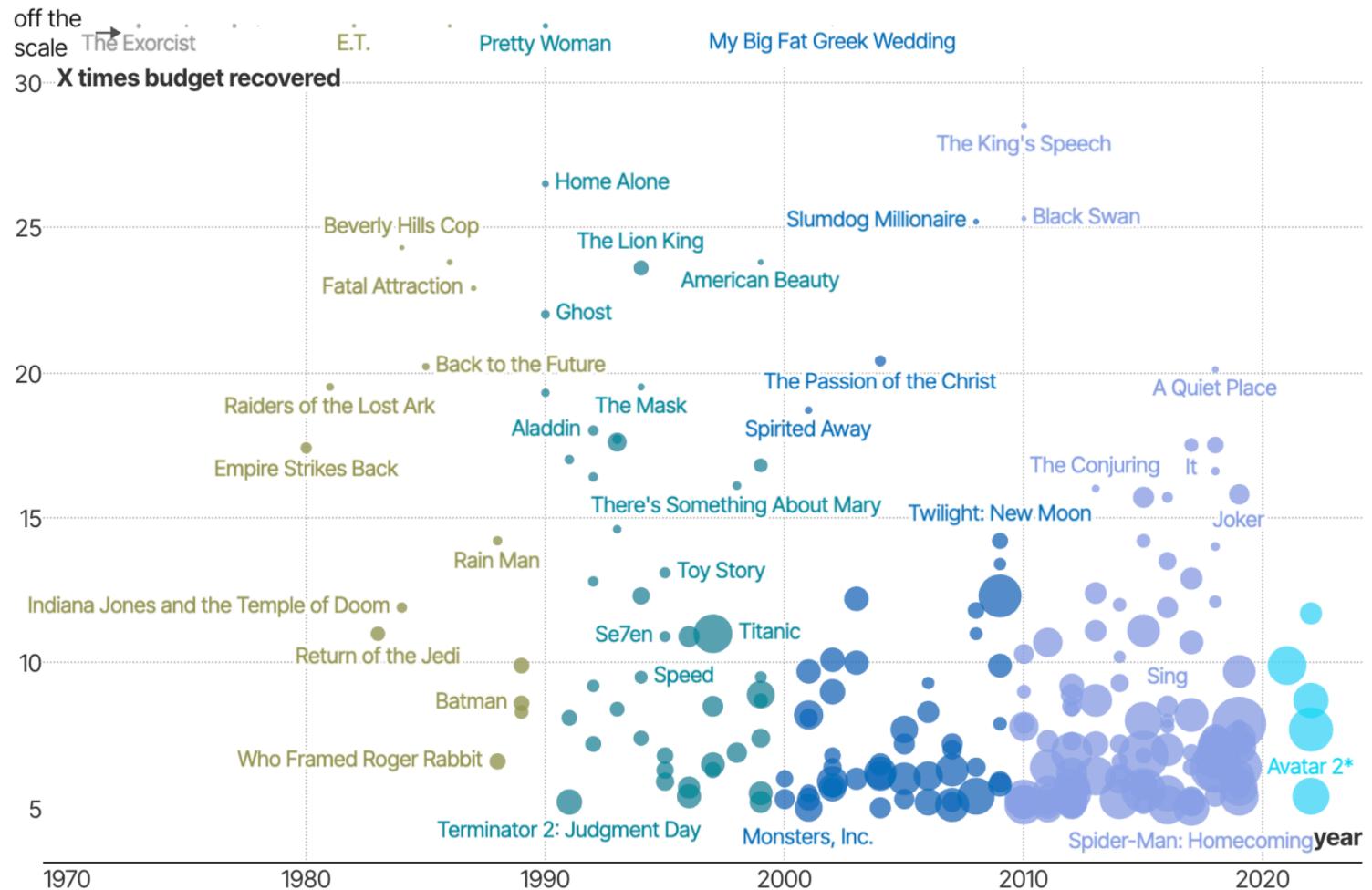
## **Graphic Design**

Limited attention: you have seconds to get and keep someone's attention.

Limited memory: working and long-term memory

Limited perceptual channels

1970's 1980's 1990's 2000's 2010's 2020's size = budget



Information is Beautiful

David McCandless, Tom Evans, Paul Barton

Top 500 movies // \* = to date  
source: TheNumbers.com



Figure 2: source: [www.hotbutterstudio.com](http://www.hotbutterstudio.com)

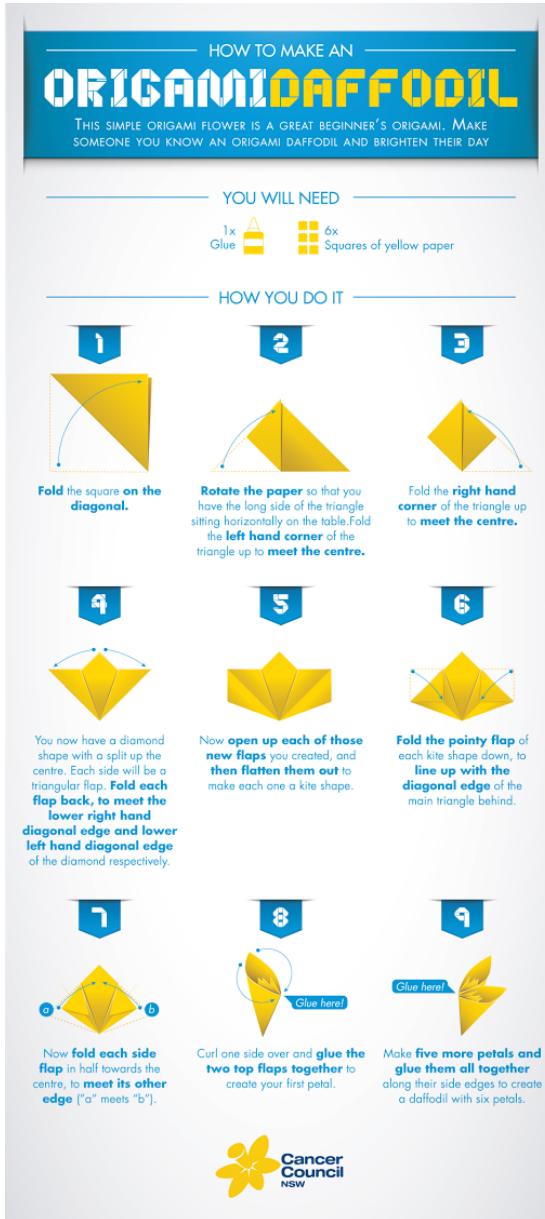


Figure 3: source: [www.hotbutterstudio.com](http://www.hotbutterstudio.com)

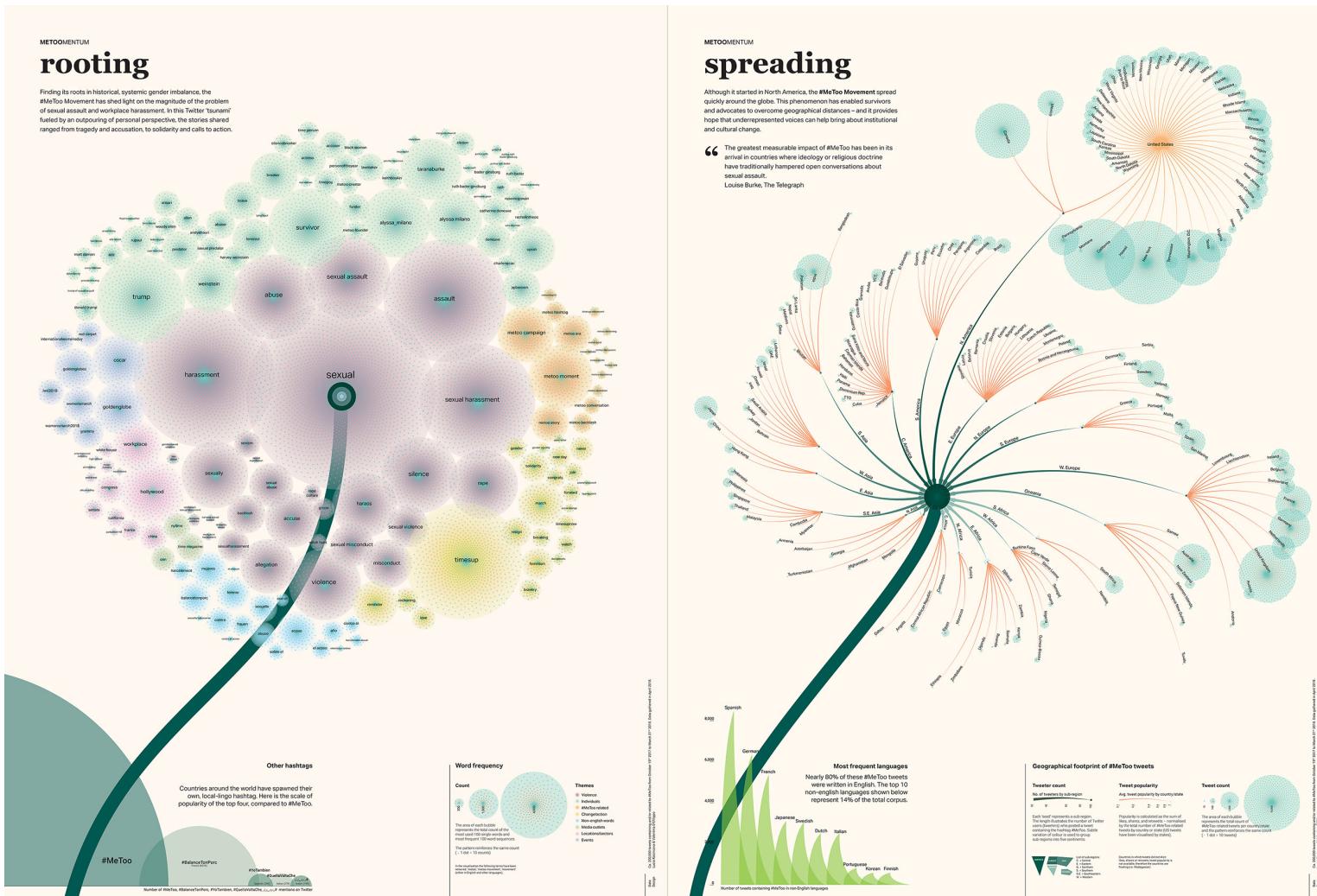


Figure 4: source: <https://www.valentinadefilippo.co.uk/>

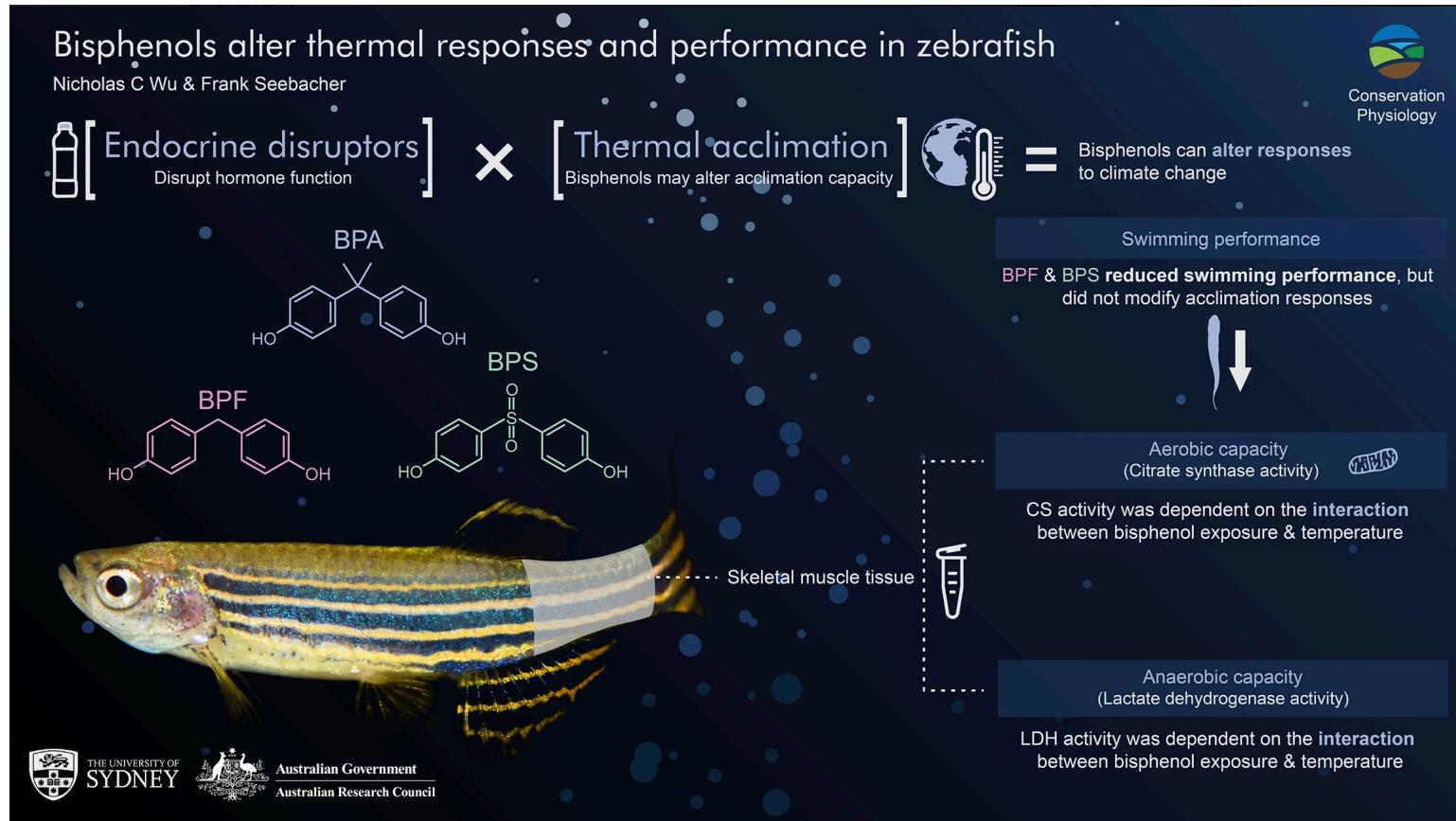


Figure 5: source: <https://wunicholas.wixsite.com/>

## **Some of the elements of graphic design**

Hierarchy

Scale

Color

Line

Shape

Alignment

Space

Contrast

### **Hierarchy**

Read this first.

Read this second.

Read this third.

### **Scale**

Scale affects how big or small your visualization can still be legible.

# Unravelling the pathogenesis of chytridiomycosis

Nicholas C. Wu<sup>1\*</sup>, Rebecca L. Cramp<sup>1</sup>, Michel E. B. Ohmer<sup>1,2</sup>, & Craig E. Franklin<sup>1</sup>

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## INTRODUCTION

- Frogs infected with the fungal pathogen *Batrachochytrium dendrobatidis* (*Bd*) show skin disruption.
- Increasing rate of skin shedding (sloughing) regulates *Bd* growth. However, the act of sloughing also alters skin function.
- The interaction between increased sloughing & chytridiomycosis on skin function may be detrimental to the animal's health.

## AIMS

- Determine whether *Bd* directly inhibits skin ion transport proteins.
- Establish if increased sloughing frequency contributes to further disrupt the skin when infected.

## METHODS

Subjects: Green tree frogs (*Litoria caerulea*)  
Treatments: Treatments (uninfected or infected), groups (intermolt or sloughing).

Measured:

- Rate of whole animal ion loss (Conductivity)
- In-vitro skin electrophysiology (Using chamber)
- Protein abundance of skin ENaC and NKA (Western blotting)
- Gene expression of skin ENaC and NKA (qPCR)



● Intermolt – 40% decrease sodium uptake  
▲ Sloughing – 200% increase sodium uptake

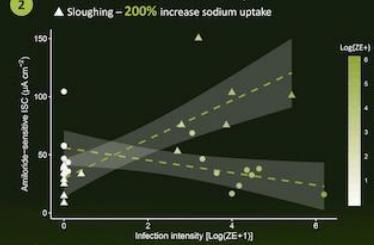


Fig. 2 | Cutaneous sodium uptake (mAmpK-sensitive short-circuit current ( $\mu\text{A cm}^{-2}$ )) over infection intensity ( $\text{Log}(ZE+1)$ ). Shaded area around regression lines represents 95% confidence intervals, & data presented as data points for each animal (● intermolt, ▲ sloughing).

## CONCLUSION

- Bd* directly disrupts the ENaC proteins responsible for sodium uptake.
- Sloughing seems to provide a temporary relief, establishing skin function (seen in sodium uptake, & increased NKA).
- However, this restoration is brief, & the proteins are destroyed as *Bd* re-establishes on the skin.
- This study highlights why sloughing can be detrimental for susceptible species that develop high infection, & may accelerate disease progression.

## RESULTS

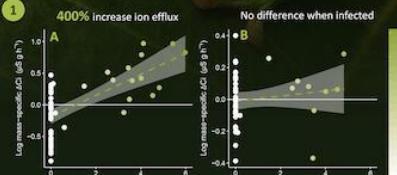


Fig. 1 | Relationship between mass-specific ion loss ( $\Delta C$ ;  $\mu\text{s m}^{-2}$ ) & infection intensity ( $\text{Log}(ZE+1)$ ) during (A) the intermolt & (B) sloughing. Horizontal line denotes mean residual. Shading around regression line represents 95% confidence interval, & data presented as individual points for each animal.

ENaC NKA



\*Infection increases ENaC and NKA mRNA expression

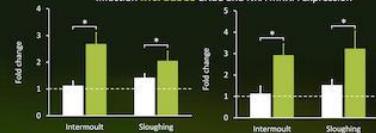


Fig. 3 | Relative protein abundance (top) & mRNA expression (bottom) of epithelial ion transporters ENaC (left) & NKA (right) in the ventral skin of infected and uninfected *L. caerulea* during intermolt & sloughing period. Data presented as the mean ± s.e. fold change relative to uninfected intermolt group (dash line), & \* represent significant differences between treatments.

## Acknowledgements

Research Training Program scholarship (Funding)  
Peter Rankin Trust Fund for Herpetology (Funding)  
University of Queensland (Ethics approval)  
Australian Animal Ethics Committee (Ethics approval)  
Adam Brice (Cover photograph)





## Color

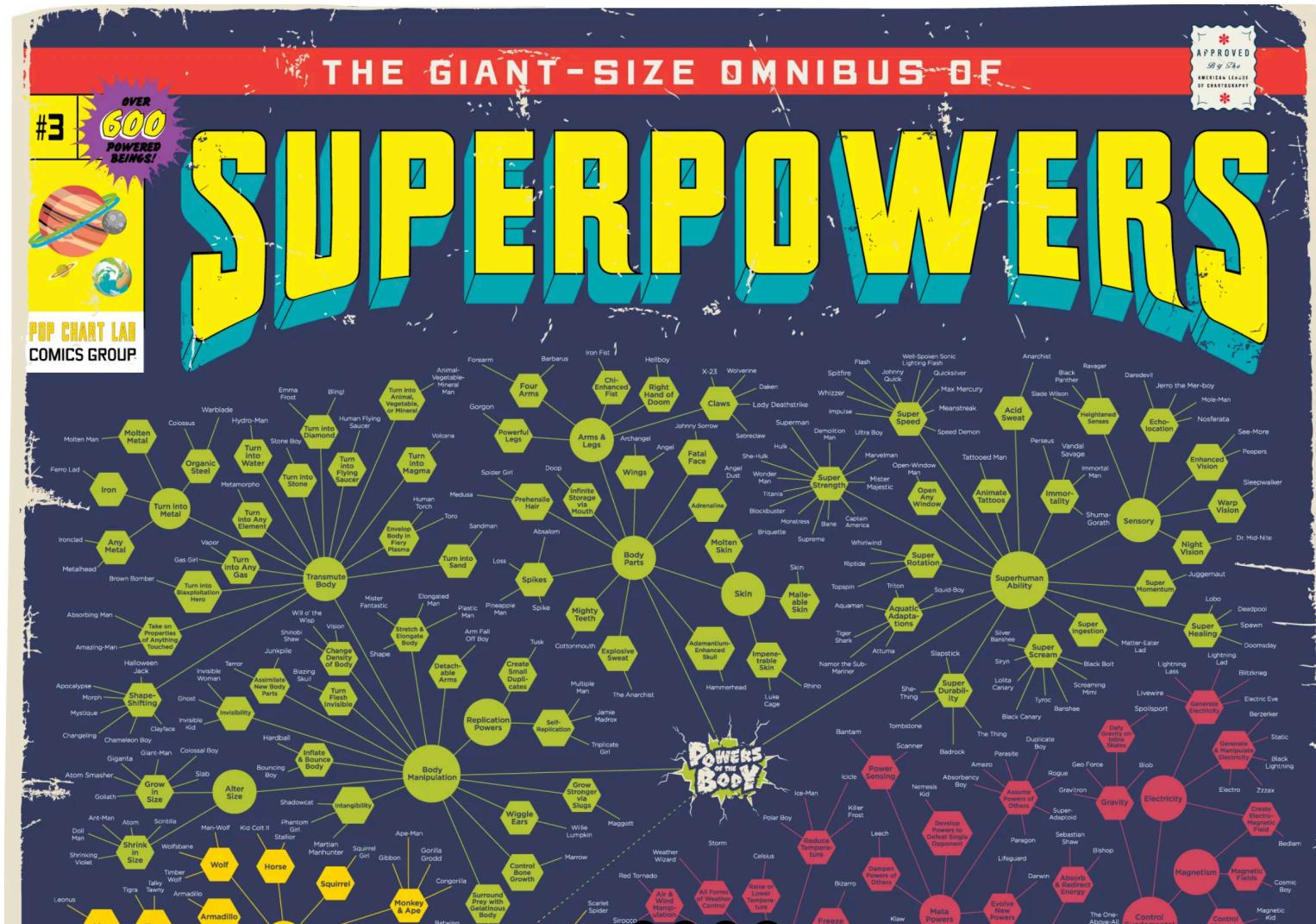
Color is huge.

Here are some resources:

For scientific publications: <http://vrl.cs.brown.edu/color>

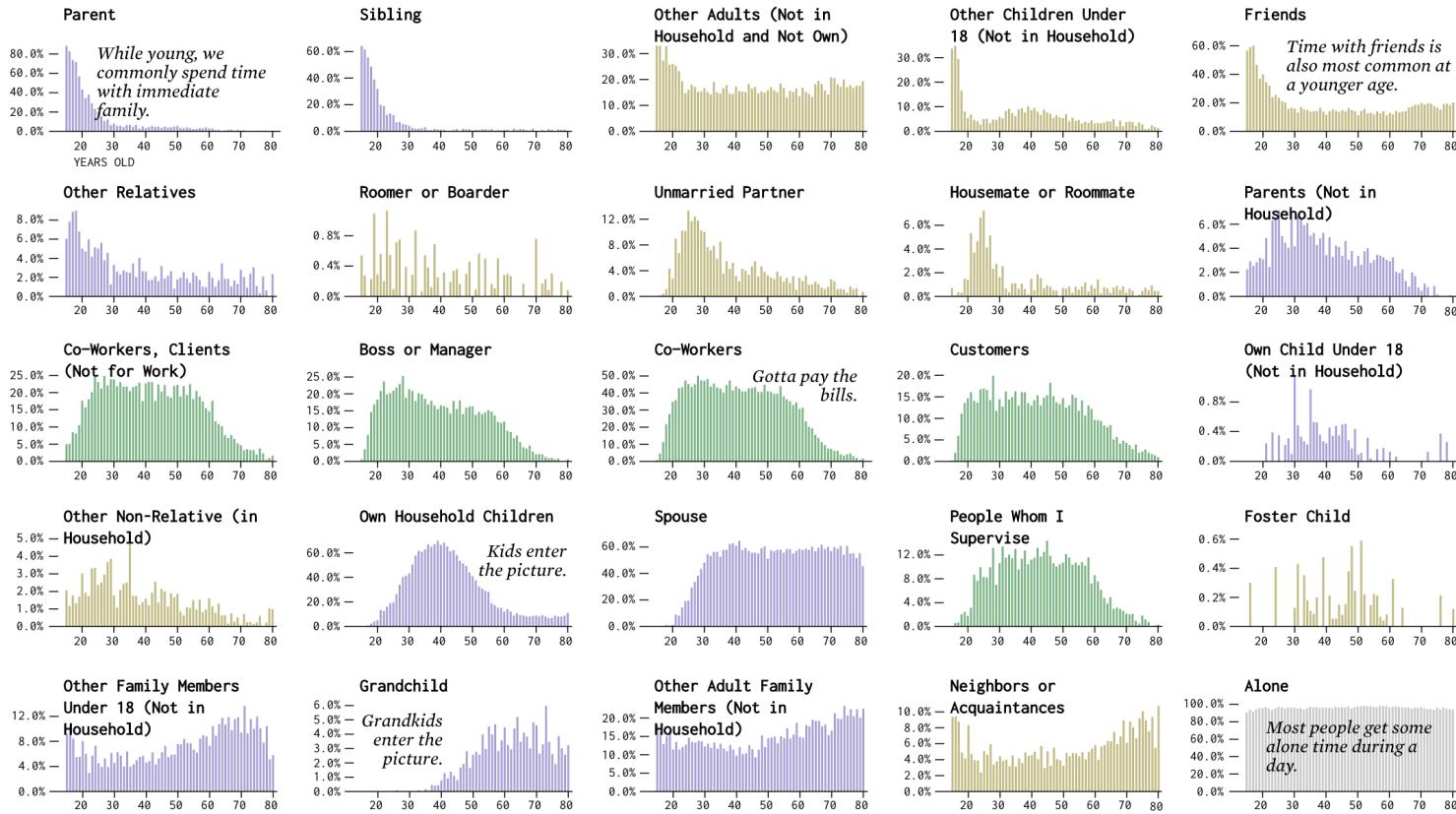
Super easy and beautiful color palettes: <https://color.adobe.com/create/color-wheel>

So many more: <https://sites.google.com/view/visres/special-topic-color/noteworthy-and-popular-color-resources?authuser=0>



## WHO WE SPEND TIME WITH, BY AGE

Sorted by peak age from youngest to oldest.



SOURCE: American Time Use Survey 2011-2019 / BY: FlowingData

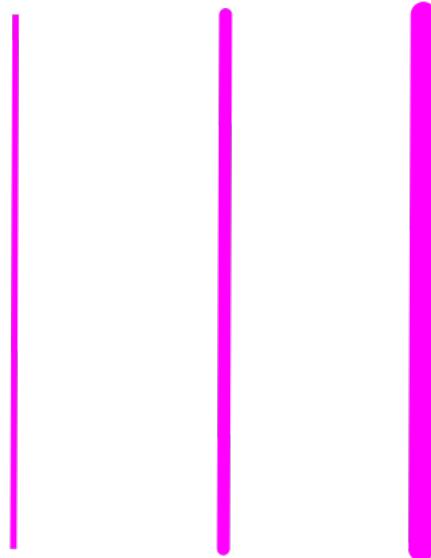
Colorgorical

# Adobe Color

## Line

Line weight helps to separate and define.

How does this look big? Or small?



## Shape

What do these shapes mean?

UPDATED FEB. 27, 2023, AT 10:53 AM

# How popular is Joe Biden?

An updating calculation of the president's approval rating, accounting for each poll's quality, recency, sample size and partisan lean. [How this works »](#)

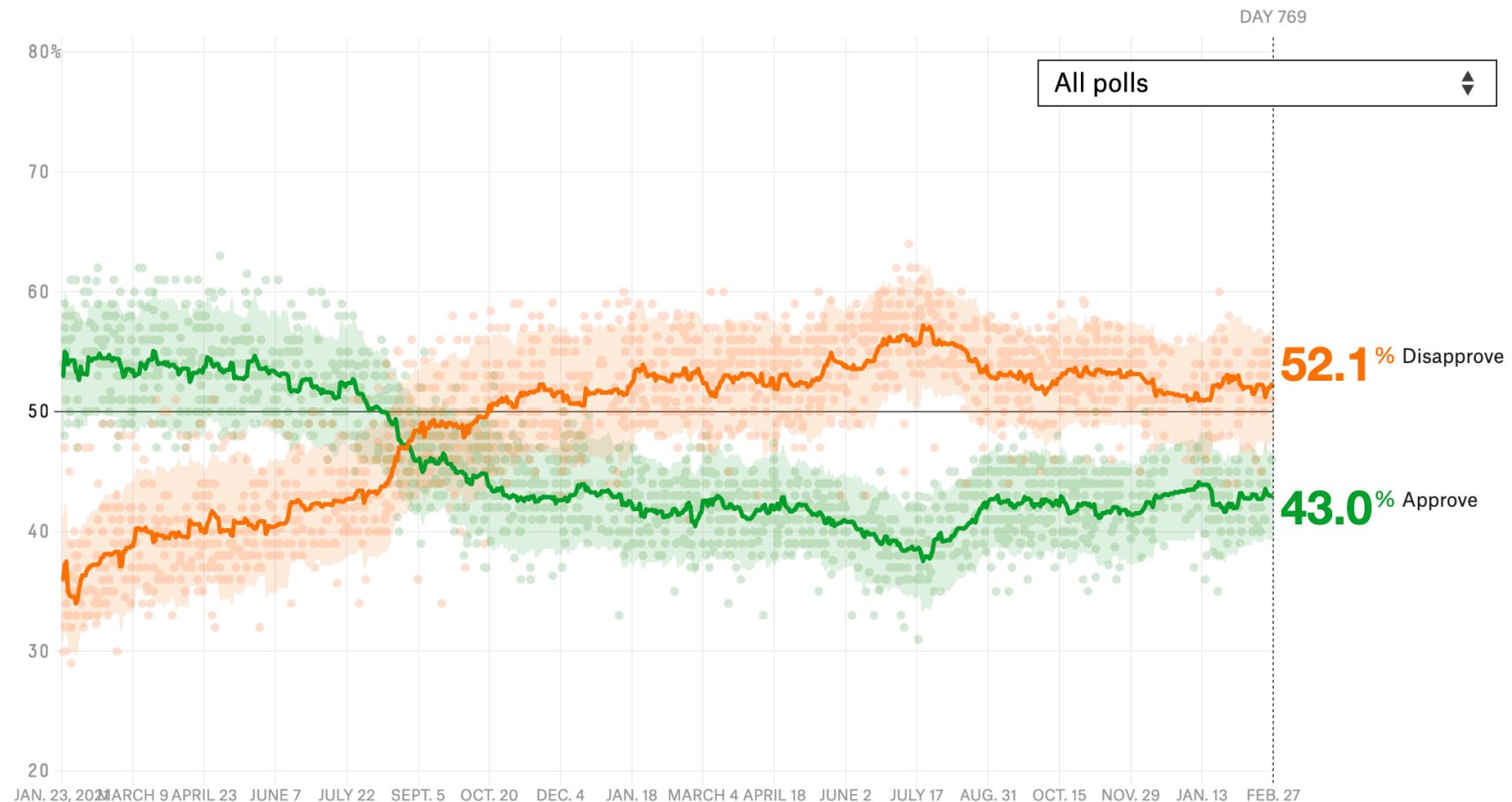
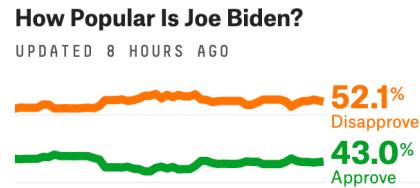
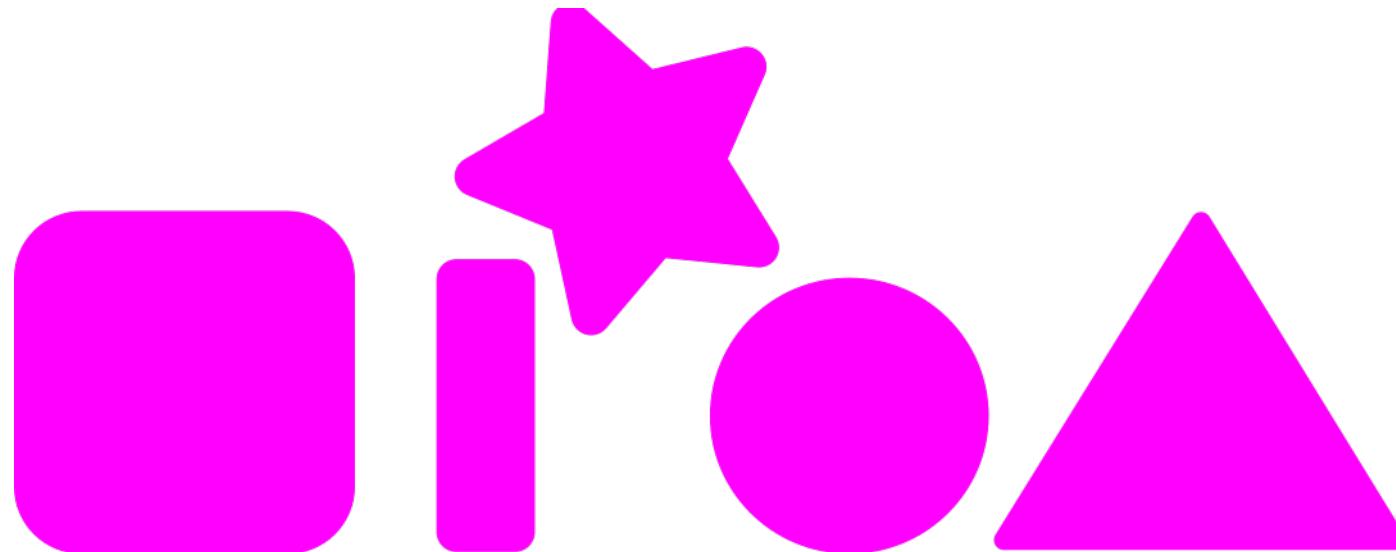


Figure 6: source: <https://fivethirtyeight.com/>



How might they be interpreted in the context of the narrative?

See Ferdio's 100 visualizations with just 6 data points. <https://100.datavizproject.com/#>



## Alignment

Alignment helps your reader orient themselves and predict where information will be.

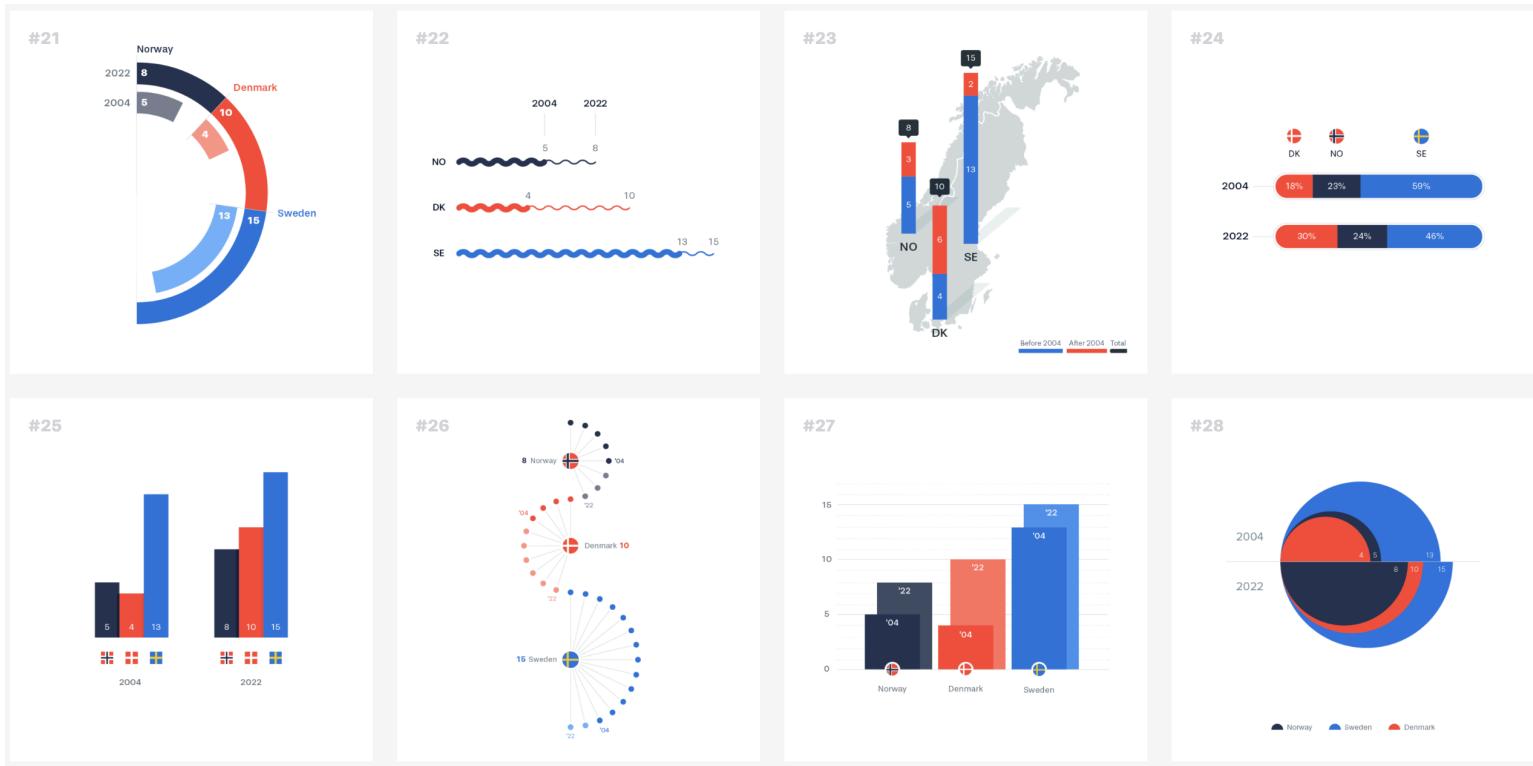


Figure 7: source: <https://100.datavizproject.com/#>

The grid has a dedicated following.

## **Space**

This is the resting space around text and visuals. It gives the eye time to rest and move between salient points. (Eye movements are called saccades.)

Also called negative space, or ground.

# Lorum Ipsum

  | Lorem ipsum dolor sit amet,  
  | consectetur adipiscing elit, sed  
  | do eiusmod tempor incididunt  
  | ut labore et dolore magna  
  | aliqua. Ut enim ad minim  
  | veniam, quis nostrud  
  | exercitation ullamco laboris nisi  
  | ut aliquip ex ea commodo  
  | consequat.



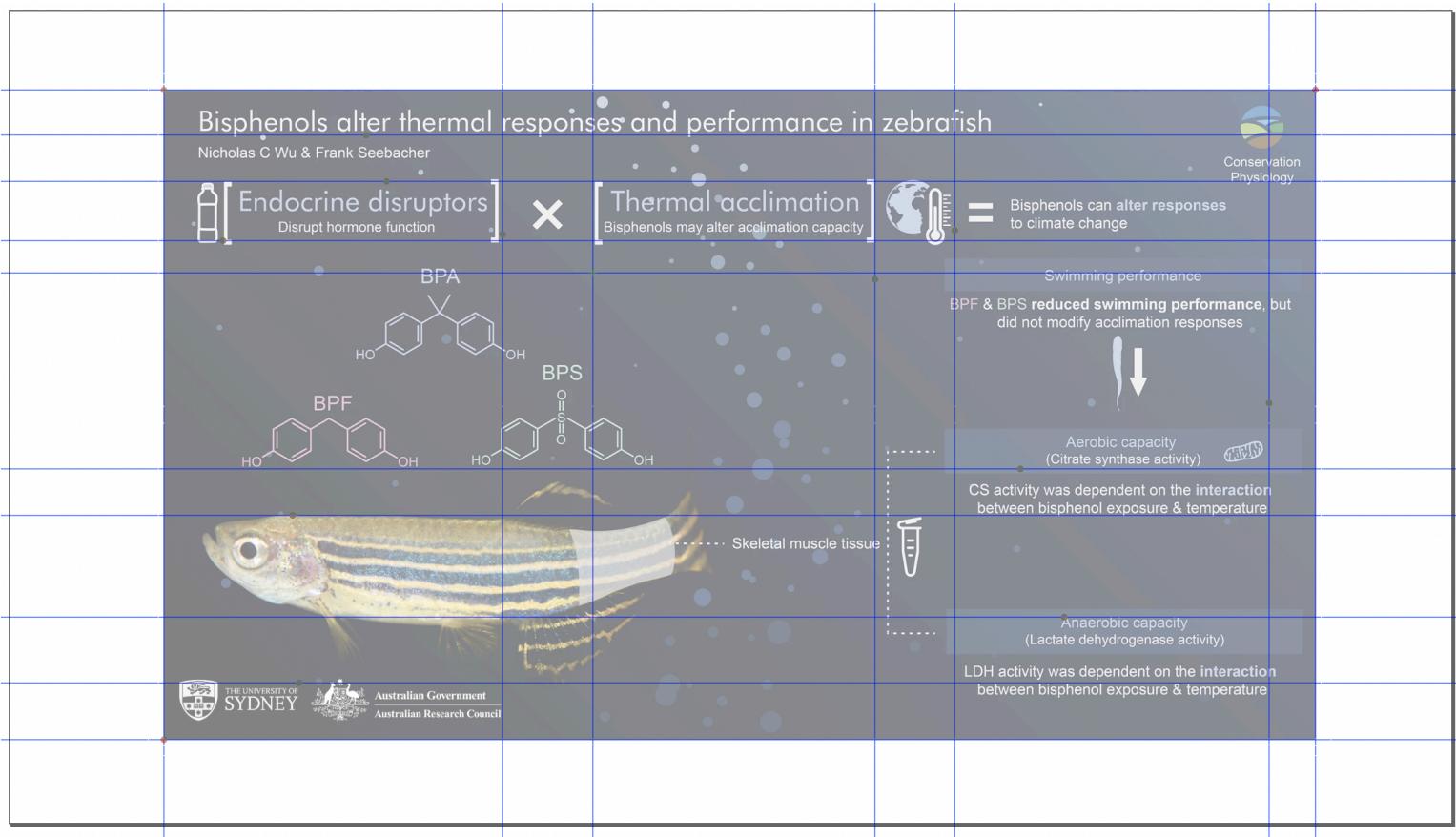


Figure 8: The grid on Nicolas Wu's fish poster.

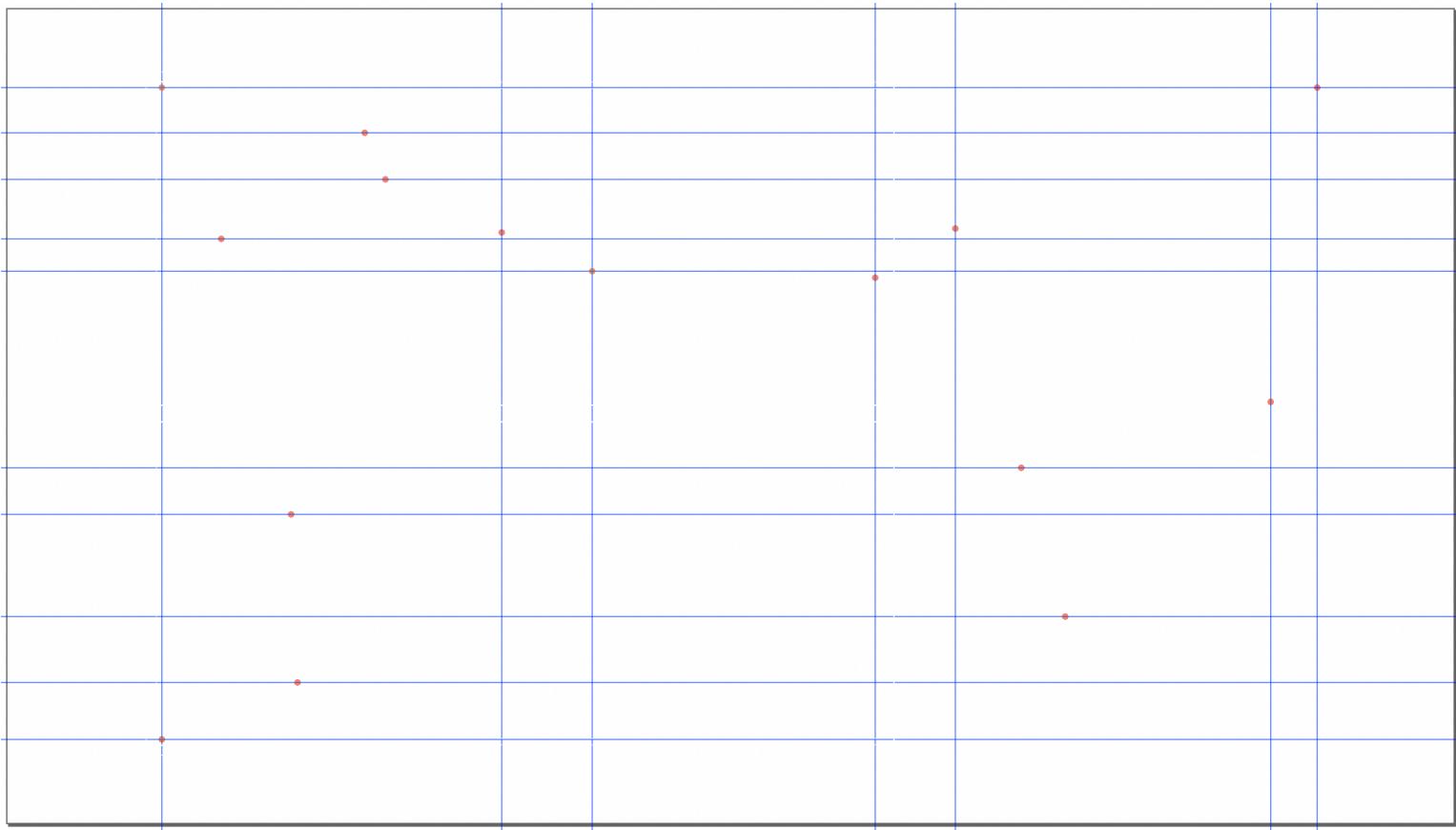
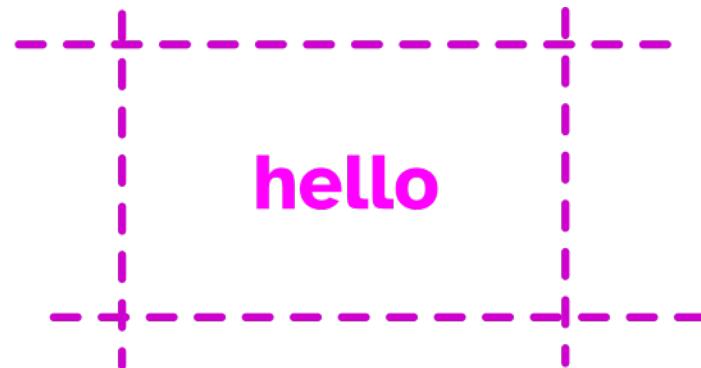
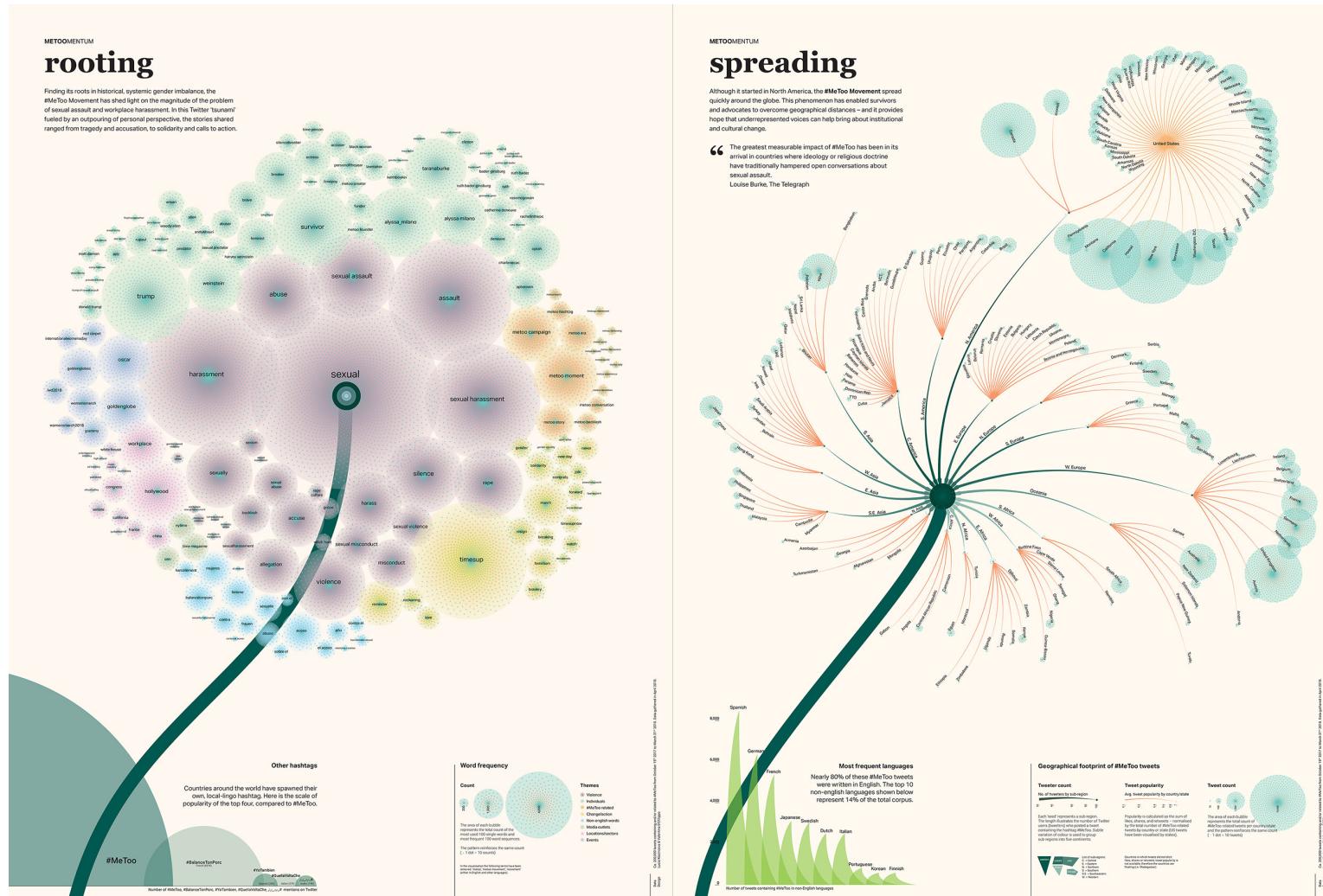
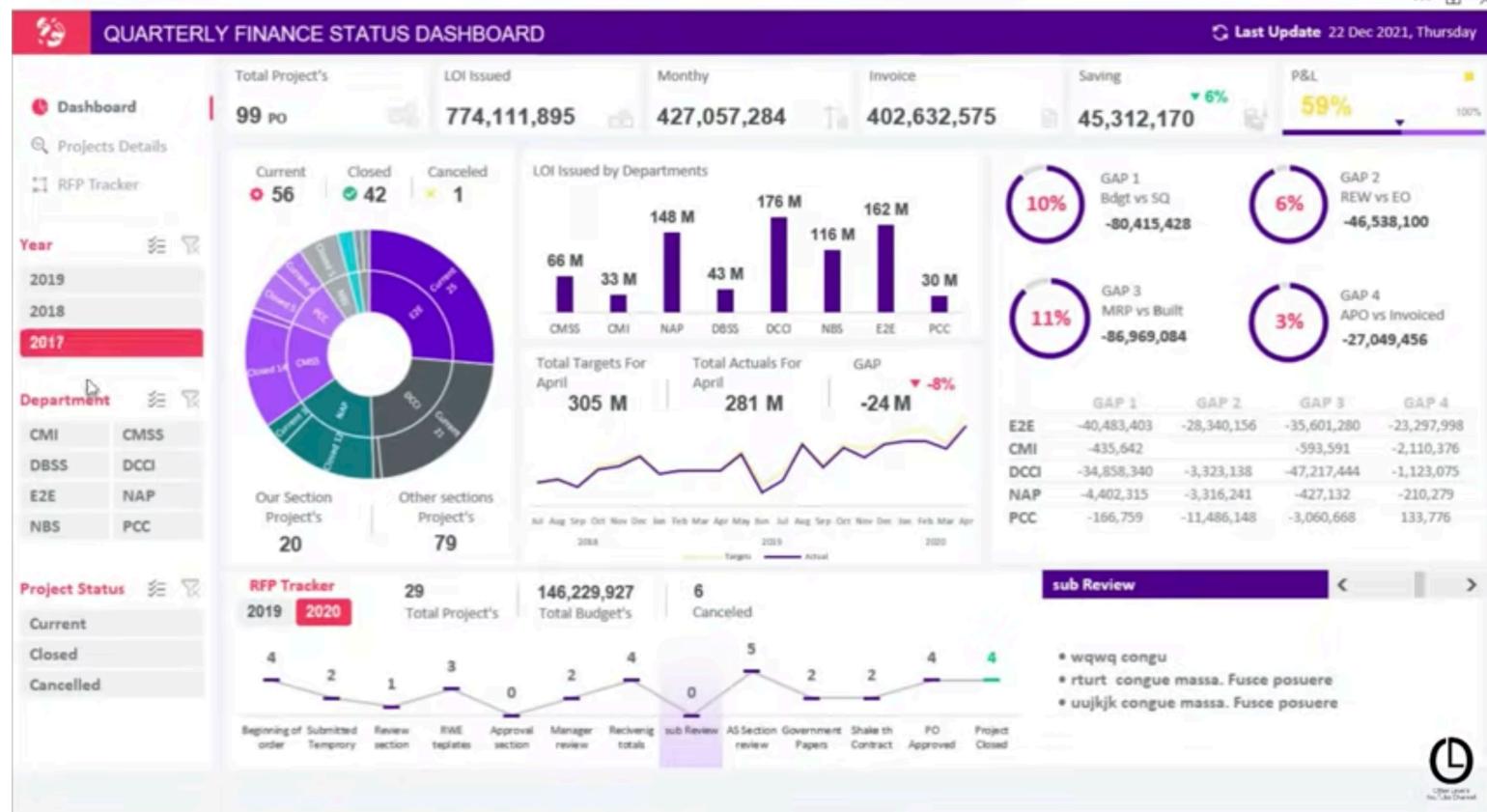


Figure 9: Just a grid.







## Contrast

This affects:  
hierarchy  
color

line

shape

type

# Type contrast

## 8 Elements of graphic design

Hierarchy

Scale

Color

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Contrast



Figure 10: source: <https://venngage.com/templates/infographics/world-population-infographic-17f9648f-3af9-4dbb-93de-bf26a0e82936>

## **Resources**

### **Open source or free tools**

Survey from the Journal of Visualization: <https://sites.google.com/view/visres/home?authuser=0>

DataWrapper: <https://www.datawrapper.de/charts>

canva: <https://www.canva.com/login>

flourish: <https://app.flourish.studio/templates>

Draw.io: <https://app.diagrams.net/>

inkscape: <https://inkscape.org/>

### **Visualization galleries**

A catalog of data visualization types: <https://datavizcatalogue.com/>

Information is beautiful: <https://informationisbeautiful.net/>

### **Visualization blogs**

Data Visualization Society: <https://www.datavisualizationsociety.org/>

& their youtube channel: <https://www.youtube.com/@DataVisualizationSociety>

DataWrapper: <https://blog.datawrapper.de/category/data-vis-dispatch/>

Visualization Universe: <http://visualizationuniverse.com/>

Visualizing Data: <https://www.visualisingdata.com/blog/>

## **Fonts**

Fonts: <https://fonts.google.com/>

Icons: <https://fontawesome.com/icons>

Lorum Ipsum: <https://lorem ipsum.io/>

## **Color**

Adobe Color: <https://color.adobe.com/create/color-wheel>

I Want Hue: <https://medialab.github.io/iwanthue/>

## **Thank you!**

Feel free to reach out with any questions, comments, or other sources of inspiration!

Poppy Riddle

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